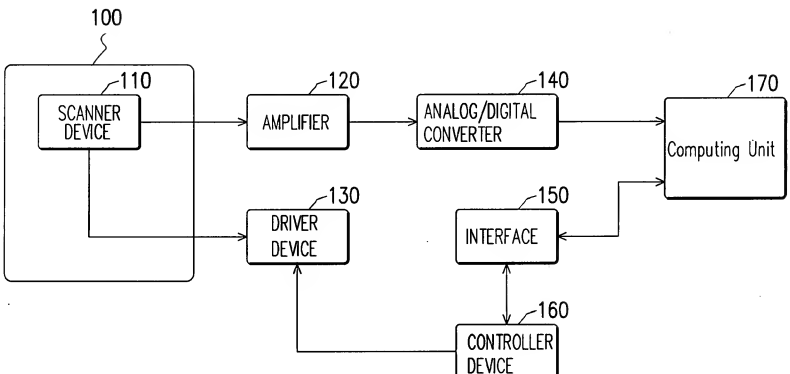

FIG. 1

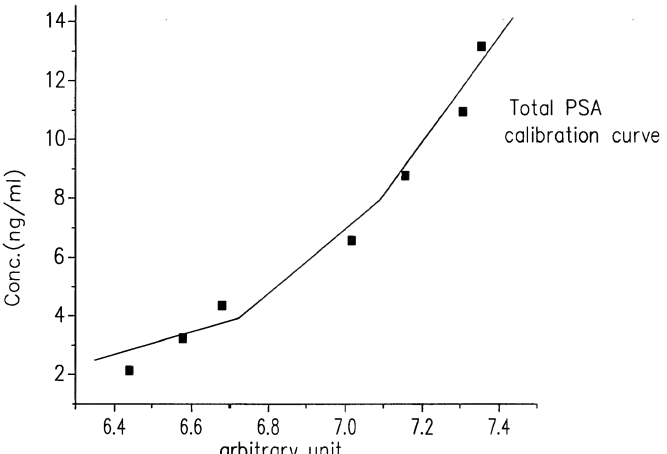

FIG. 2A

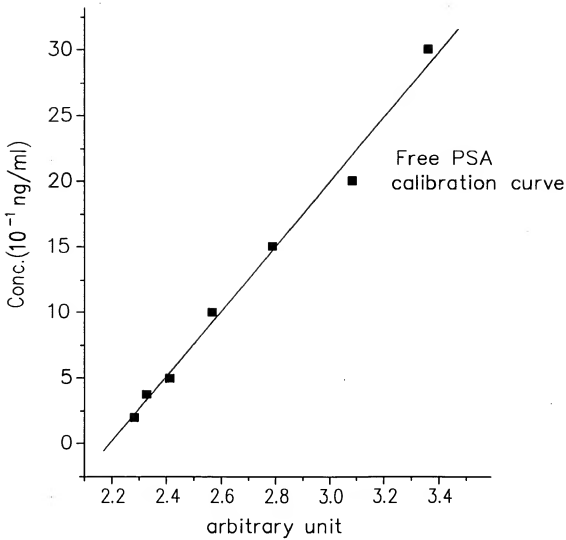

FIG. 2B

QUANTITATIVE SCANNING ANALYSER UNIT

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The invention relates to chemical, medical, and biotechnological testing methods. More particularly, the invention relates to a scanning analyzer unit suitable that provides quantitative testing results in agricultural food processing, environmental pollution monitoring, clinical point-of-care testing, and other biotechnological applications.

Description of the Related Art

[0002] Regardless the location or the manner accomplished, chemical and biochemical analysis methods are fully described in terms of their performance characteristics. The performance characteristics principally are accuracy, sensitivity, specificity, rapidity, easiness, and economy. Accuracy, sensitivity, and specificity usually characterize the reliability of the analyses while rapidity, easiness, and economy characterize the practicability of the analyses.

[0003] In agriculture, food processing, environmental pollution management, and in-vitro clinical diagnosis, analysis performance generally emphasizes on reliability characteristics while practicability aspects are less considered. However, in many specific situations where chemical and biochemical analyses must be performed on site, the practicability of the analysis methods becomes an important factor.

[0004] With the example of pesticide residual, in-field, pre-market, and on-line process analyses conventionally require on-site equipment to monitor the concentration

of pesticide residues in vegetables, fruits, dairy, meat, and relevant products. Currently, on-site analytical equipment mostly provides qualitative results; the resulting observation is therefore less meaningful than the observation provided by laboratory equipment and methodologies. Moreover, because pesticide contamination of agricultural products and ground water usually needs multi-targets detection, on-site multi-quantitative testing equipment is therefore required.

[0005] In clinical in-vitro diagnosis (IVD), additional to reliability requirement, the rapidity of obtention of the test results is even more crucial than in the case of environmental and agricultural management. The consideration of rapidity and other efficiency factors in clinical testing is known as point-of-care testing (POCT). POCT has typically evolved from a demand for short turn-around-time (STAT) analytical results to be available from sources other than typical central laboratories. By bringing analysis systems closer to the patients, the obtention of STAT results is facilitated, which improves the medical treatments and benefits the patients.

[0006] With respect to POCT, rapidity and easiness are considered as prevalent practicability factors while sensitivity and specificity are prevalent reliability factors. POCT systems are usually demanded in hospital locations such as emergency rooms, intensive care units, operation rooms, cardial pulmonary rooms, recover rooms, or even in ambulances. POCT systems are also demanded in many relevant clinical locations.

[0007] A representative example of POCT systems is that which uses multi-marker components. Results provided by POCT multi-marker enable precise, accurate, and early diagnosis of certain diseases. The POCT supports that use multi markers may appear under various forms such as paper testing or test kits where samples are put in contact with the markers. The testing results usually consist of color or aspect

change signals that are evaluated through the physician's perception. Taking the example of prostate specific antigen (PSA) tests, both complex and free PSA are quantitatively measured to distinguish prostate hyperplasia and malignancy. For acute myocardial infarction (AMI), three specific cardiac markers, that are myoglobin, creatine kinase MB, and troponins (I or T, or fatty acid binding protein), are usually quantified for disease triage, therapeutic intervention and monitoring of therapeutic outcome. However, in the case of PSA, the concentrations of complex and free PSA between normal persons and patients with prostate cancer vary from the level of micrograms to the level of sub-nanograms. In the case of AMI, the concentration differences of these clinical markers between the normal persons and sick patients vary even more than in the case of PSA: they may vary from the level of milligrams to the level of sub-nanograms. It is therefore difficult to differentiate the concentrations of these disease markers by only observing the reflectance changes of one single chromogenic compound in POCT quantitative immunoassay.

SUMMARY OF THE INVENTION

[0008] A first aspect of the invention is therefore to provide a multiple scanning analyzer unit that provides immediate and objective quantitative results from conventional testing supports that deliver scannable results. As a result, adequate actions can be taken to manage environmental pollution, agricultural product contamination, and therapeutical intervention.

[0009] Furthermore, another aspect of the invention is to provide a portable scanning analyzer unit that can analyze the results of the testing supports so that the responses can be more conveniently justified on sites.